Using CS2023 to Create Computer Science Courses and Curricula

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Abstract

In this special session, the knowledge model and competency framework of CS2023 will be presented. The steps for using them to design computer science courses and curricula will be discussed.

1 Overview

The Association for Computing Machinery (ACM) has been publishing curricular guidelines for computer science since 1968 [1,2]. Since 1991, it has been collaborating with IEEE-Computer Society (IEEE-CS) to produce these decennial reports 1991 [3,4,5,6]. For the latest curricular report on computer science (CS2023), the Association for the Advancement of Artificial Intelligence (AAAI) also joined the effort, given the increased role of artificial intelligence in undergraduate computer science. The three professional bodies together set up a task force of educators and practitioners from around the world that worked for three years to produce CS2023 (csed.acm.org). In this special session, the CS2023 report will be presented and discussed.

The CS2023 task force undertook the following activities:

- Revision of the knowledge model of the curriculum last published in 2013 [6]. The knowledge model consists of 17 knowledge areas. Each

knowledge area consists of knowledge units that are groups of related topics and learning outcomes.

- Design of a competency framework that can be used by adopters to build a competency model of the curriculum. This includes a framework for systematically identifying tasks, a format for competency specification, and an algorithm to use the competency framework to build a customized competency model.
- Curricular practice articles written by experts on social issues, professional practices, pedagogical concerns, and programmatic considerations. The goal of the articles is to summarize the state of the art, inform educators, and attempt to advance computer science education practices.

In this special session, the knowledge model and competency framework of CS2023 will be presented. The steps for using them to design computer science courses and curricula will be discussed.

2 Acknowledgements

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3 References

[1] William F. Atchison, Samuel D. Conte, John W. Hamblen, Thomas E. Hull, Thomas A. Keenan, William B. Kehl, Edward J. McCluskey, Silvio O. Navarro, Werner C. Rheinboldt, Earl J. Schweppe, William Viavant, and David M. Young. 1968. Curriculum 68: Recommendations for Academic Programs in Computer Science: A Report of the ACM Curriculum Committee on Computer Science. Commun. ACM 11, 3 (March 1968), 151–197. https://doi.org/10.1145/362929.362976

[2] Richard H. Austing, Bruce H. Barnes, Della T. Bonnette, Gerald L. Engel, and Gordon Stokes. 1979. Curriculum ’78: Recommendations for the Undergraduate Program in Computer Science— a Report of the ACM Curriculum Committee on Computer Science. Commun. ACM 22, 3 (March 1979), 147–166. https://doi.org/10.1145/359080.359083

[3] Allen B. Tucker, Robert M. Aiken, Keith Barker, Kim B. Bruce, J. Thomas Cain, Susan E. Conry, Gerald L. Engel, Richard G. Epstein, Doris K. Lidtke, Michael C. Mulder, Jean B. Rogers, Eugene H. Spafford, A. Joe Turner, and Bruce H. Barnes. 1991. Computing Curricula 1991: Report of the ACM/IEEE-CS Joint Curriculum Task Force. Technical Report. ACM Press and IEEE Computer Society Press, New York, NY, USA.

[4] The Joint Task Force on Computing Curricula. 2001. Computing Curricula 2001. J. Educ. Resour. Comput. 1, 3es (Sept. 2001), 1–es. https://doi.org/10.1145/384274.384275

[5] Lillian Cassel, Alan Clements, Gordon Davies, Mark Guzdial, Renée McCauley, Andrew McGettrick, Bob Sloan, Larry Snyder, Paul Tymann, and Bruce W. Weide. 2008. Computer Science Curriculum 2008: An Interim Revision of CS 2001. Technical Report. ACM Press, New York, NY, USA.

[6] ACM/IEEE-CS Joint Task Force on Computing Curricula. 2013. Computer Science Curricula 2013. Technical Report. ACM Press and IEEE Computer Society Press. https://doi.org/10.1145/2534860 Accessed: November 14, 2017.

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